Menlo Park Notebook #124 [N-80-11-18]

This notebook covers the period November-December 1880. Most of the entries are by Francis Jehl. A few entries appear to be by Francis Upton. The book contains notes and calculations relating to tests of experimental lamps. Included are tests of bamboo, bast, paper, and gasoline-treated carbons. The label on the front cover is marked "Lamps Lot D" and "Francis Jehl." There is an index on the inside front cover. The book contains 284 numbered pages.

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197° - 198° = 16 candle

R $\frac{31406 + 5000}{200}$

Nov 16

34°

10 35° = 34° C

$\frac{\begin{array}{r}264\\54\end{array}}{320}$

[illegible]

7 36 grains

$\frac{\begin{array}{r}348\\35\end{array}}{13}$

Index.

Analysis of Lamps tested—23 25, 27, 29, 31, 55, 173

Bamboo and Bass Carbons Tested—1, 6, 7, 15, 17, 19, 21, 23, 25, 27 33, 35, 37, 41, 43, 45, 47, 49, 51, 53, 63, 65, 67, 71, 73, 75, 77, 85, 87, 91, 95, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 191, 120, 121, 123, 125

"

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BOARD OF PATENT CONTROL,

120 BROADWAY, NEW YORK.

From Library
44 Broad St. N.Y.

May 1, 1896

Paper-Loop Carbons tested;
79, 81, 83.

197° - 198° = 16 candle

R $\frac{31406 + 5000}{200}$ Nov 16

34°

10.35° = 34° C = 93 1/5 F

10.48 50.3/4 C

---

vessel lamp + water 1056

vessel + lamp 261

lamp 59

261
59
320.

1056
320
736 grains

3 48
35
.13

50.75
34
16.75 c

736 gm
15.43

13)37717.65 (2901.3 ft
26
117
117
17
13
46
39

2901)3900-0-0 (11
2901
3990
2901
9890

736
15.43
2208
2944
3680
736
7000)11356.48 (1.62 lbs
7000
43564
42000
15648
14000

1.390
1.62
2780
8340
1390
225180
16.75
112590
157626
157080
225180
37717.6500

[illegible] 736 [illegible]
[illegible] 191
[illegible] 10 95

[illegible]

368

288 [illegible]

720

[illegible]

23040

[illegible] 1/10 [illegible]

197
198
3|395
132 V
182 R

31406
5000
200)36406(182
200
1640
1600
406

182)772020 (4
748

3
182)772020(4241
728
440
364
762
728
340

Bailey 32 — 32

Def 192 – 6 196 = 16 C

42.3

3.56 o'clock
4.16
195 – 196

2 34
2

3 | 468
156.5 —

(3.56)(1) Time
(4.16)(2)

Def 195 – 196

42.37°
92.17°) Temp

Weight with vessel + water

	1286.5
Lamp 58	417.5
Vessel 202¼	869.0

(156.5 feb)

---

52. C. 4.45.5.15
JSB

14

17
6 3
2 4

$17\cancel{0})10780 9\cancel{1}(6335$
102
58
51
60
51
99 $\overset{5}{3}$ 4
85

3844.5.6
.19.1
38445 6
3462704
36[illegible]56

20)73408046 (3471
94 3672
40
49
31
119

.0471)[illegible] (9.5.
17610

10 11 0
92.17
42.37
49.87 0
77 2
996
3486
3486
3844 5.6

2.1

869 gms
15.43
2607
3476
4245
869
700)1340867 (1.91
64086
63000
10860

.869
2.2
1738
1738
1.911 8.

30 [illegible]

2) 4.9.8
2.49 per minute

1.91 0.2810
2.49 0.3962
775 2.8893

3.5665

3685

These figures were on cover of this book.

$\frac{5}{9} \pm \frac{160}{9} = 34$

9

306

160

5/466

93.5

180

170

Nov 18

(lamp marked 3 hours but 217

179 - 179 (EMF, (400

2

25.1273 3)358

3400 119 V

20)28527(142 Res

85

80

52

Hg in the Globe,

Put up at 3,40 Nov 1880

Lamp old style (now 240) *

207 - 207 EMF.

207
2
3)414
138

37687 + 700
700

20)38387 (191 Res.
20
183
180
3

No 16

Put up at half past two Nov 18/88

Nov 18

17

18

26.5

25

~~5~~380) 33000 (7.5
30660
23400
~~50~~

(Lamp 460 down to 222)

178 – 178 E M F *

2512
3500

20) 2~~2~~627 (~~10~~ Res
20
162
160

178
2
3)356 2 2
118

(2.86

143 ohms

178
178
(356
119

143) 627330 (~~5~~ 380
~~125~~
572
553
429
1240

Put up at 16 at 2.30. Nov 18 1880

218

209 — 209

37687
6200 R

209
2
3(418
139

16

Lamp marked (350 ohms)
old style 12 Bamboos 115 ohms

2) 43887 (219
40
35
2
188
180

135.63) 670210.00 ([illegible]
~~67815~~
54252
127670
123067
46230

4930

4930) 33000 (6.6
29580
34200

17
421
29

Nov 19

Lamp marked " Bast Plat Clamp 5 hours Carbonization Extra high heat." "without C but partial vac 314 with C 21.5 Pv." "Previous 305"

---

185 - 185

185
185
370
123

25127 + 2000
25127
27127
135.63

16

190 - 190

25127 + 1700

Put on at 2:30 at 16 C
Off Sunday Nov 20 1880 1 oclock

163) 616830. (4150
592
248
163
850

4150) 33000 (

Nov 19

"Blue on Plat wire' = now after
2 hours 250" "Bast Plat Clamp
5 hours carbonization Extra length
Heat " "P"rew over]3011

177 177

31406 + 1200

31406
1200
32606
163.

16 - 16

177
177
354
118

Put on at 2.30 at 16C

1032) 395000 (3820
3096
8540
8256
2840

3820) 33000 (8.6
30560
24400

---

143 - 144 Emf,
12560
6500
2|19060
95.Ohms at 22 C

138 - 138
12560
6700
2|19260
96

"48 candle for hour after spark went Res 170"

Bast - Plati clamps 5 hours carbonization Extra high heat
"Res 250"

---

142 - 142

18840 + 1800

16

18840
1800
2|20640
103.2 Ohms

See page 55

142
142
3|284
94.6 Volts

Put on at 230 at 16 C
on Sunday measured again same EMF
gave 22 C

120.7) 460 000 (3820
3621
9880
9648
2320

Nov 19

48 Candle for 1 hour after spark went left R 191
Base Plat Clamp 5 hour carbonization Extra high heat Prev 285

16 C

153
153
306
102
18840
53 000
24140
120.7

Put on at 2:30 at 16 C

117.45)469980(4000
46980
1800

4~~000~~)33~~000~~
8.25

Nov 19

186 ohms Cold
T.A.E 4 hour lamp
5 hour ordinary heat

18840
4650
23490
117.45

155
155
310
103

114 — 114 Nov 19/1880

12560
3000

2)15560
77.8

114
3)228

76. 3323.

77)255880(3323.
231
248
231
178
154

This land was put up at 16 at 3,20 Nov 19 1880

Sunday Nov 20 1887

Tested Lamp on page 29 of this book.

The lamp at 143 EM7, was 22 C, yesterday at same EM7 it was 16 C.

151 - 151

18840
3700
2|22540
112.

151
2
3|302
100

16 C.

112) 443000 (3955. ft lbs at 16 C
336
1070
1008
620
560
600
560

18840
3400
2|22240
111.

157
2
3|314
104

22 C

111) 479150 (4318 ft lbs at 22 C
444
351
333
205
111
940

Sunday Nov 20 1880

Tested hang of page 27 of this book. at 10 C

18840
400
2|19240
96.

140
2
3|280
93 ⅓

96) 383150 (3991 ft lbs
288
951
864
875
864
110

16 C

at .22 C

2|19040
95) 425460 (4475 ft lbs
380
454
380
740
685
550

148
2
3|296
98
2

4475) 33000 (7.3
31325
16[illegible]

3991) 33[illegible] (8.5
28

3991) 33000 (8
31928
2072

7 7

18 3991
399

399) 2072 (
199[illegible]
0.77

Nov 21 1880

183 — 183

25127

16

Burst 5 hour
Reg vac process
1 hour no spark
Nov 167
440 R Ro

183
3)366
122
125

5274.

2)25127
125.

125) 659360 (5274,
625
343
250
936
875
610

This lot of lamps were
Put up at 5.20. Nov
211 up to page 53

Exh 171 171

R, 18840 + 6000

16

(Bast 5 hours Rig v
Process 1 hour no spark)
191 Pres 508

18840
6000
2)24840
124

171
3)342
114 0
124 R

124) 57572 0 (4642.
496
797
744
532
496
360
248

Nov 21 1880

163 — 163

18840 + 4700

1.6

Burst 5 hours
Reg v Process
1 hour no spark
184 Prev 543

163
2
3 | 326
1080
127 R

18840
4700
2 | 23540
127

117) 516720 (4416.
468
487
468
192
117
750
702

151 – 152
18840 + 4500
16

1 other high vac
spark gone
Process 491. now 182

151
152
3 | 303
101
116 Res

18840
4500
2 | 23340
1.1.6

1.16)

116
8
28
44

45690 0
3486
1039
928
1110
1044
660
80

(~~4~~ 3895.

165 - 165

18840 + 8000

16

after hour. Spark gone
217 cold originally
455 ohms

165
2
3)330
1100
134 R

18840
8000
2)26840
134

134)53600 30 (4000.
536
030

3:

80
72
8)72(9
72

Nov 21 1880

153-153
18840 + 3600
16

Bust 5 hours
Reg vac process
1 hr no spark
175 Prev 466

Put on at 81 C at ~~3.05~~ 3.5 oclock
~~busted 3.55~~

153-153
3|306
1020
109 Res

18840
3100
2|21940
109

109)460900)4228.
436
249
218
310
218
920

165 - 165

25127 + 400

16

Boat 5 hour

Reg process 1 hr no.

Park 202

```
  165          25127
3)330            400
  110 5      2)25527
  127 Rec       127R
```

[redacted]

```
127)53630 (4220
    508
     280
     254
      263
      254
       09

4220) 33000 (8.
      33760
```

Lamped lamp on page 29
Page The Same.
27 put in at 230 nov 19 1880

2.30 nov 19
12. nov 20 Sunday
Monday

)359900
356630

122.7) 356000 (29.00
2454
11060
9802
1258

2900) 33000 (11.3
2900
4000
2900
11000

Gasoline carbon has been

15 candles

135 L
135.5 R.
133
(2695
89.8 Volts
18840
5700
(24540
122.7

Batteries
33 R
31
64

9638
9638
6464
9140
4880

3070

307

5185
4880
.0305

10.7 per H. P.

Gasoline

16 candles

137
139
276
92

18840

5550
24390
121.9

117.7) 555700.0 (4720
4708~~06~~
8490
8239
251.0

4720) 33000 (7.
33040

48
7
336

Gasoline
48 candles

165
170
335
112
18840
4700
23540
117.7

127.2) 529000 (4160
5088
2020
1272
7480

4160) 33000 (8.

Regular Nov 23

16 candles No. 1
frosted

162.5
167
(329 5
109.8

18840
6600
(25440
127.2

95.2) 418.000 (4390
3808
3720
2856
8640

4390) 33000 (7.5
30730
22760

Regular No 2

148
145
293
97.6

18840
200
19040
95.2 Ohms

119) 472000 (4000
4768

4000) 33000 (8.25
32
10

Regular .017 X .010 Bars

Nov. 23 Marked No. 3

153
157
310
103.3

18840
5000
23840
119.2

151
155

306

102

18860
4100

22960

1.148

96.5)457(47.3
~~60~~
3866
7100
6755
3450

47.3
216.
2838
473
946
102.168

115)462(4.010
460
200

Reg Bast
0'.010 X 0".017
Exactly 16 candles

227 L
230 R
5(457
152

18860
4140
(23000
115

531 2.7251
96.5 8.0155
1.3345

119 2.0751
2.0751
1.8464
7.9749

3.7715 5910
4.5185

.7470
5.58 1.6812

2.4282

268 candles per H.P.

Reg Bast
1510X017

48 candles

265
266

531

18840
2350

2)21190
105.95

1.08
2.0
216 volts

96.5) 449.5 (465
386.0
6350
5790
56.00

465
21.6
2790
465
930
100.440

~~484~~
111.3) 447.000 (401.0
4452
1800

Reg. Bart
After 48 candles

16 candles

222.5
227
449.5

18840
3420
22260
111.3

Batteries

47 R
49.5
96.5

Present reg. Bud 1.8 X 10.5

Old 17 X 8

28.5 : 25 :: 16 : 14.03

2041
3979
5452
1472

3740

3.5729
1.1461
2.4268
1.2041
3.6309

4270

~~336~~

96.5 1.9845
21.6 1.3345
.6500

2.5263
.6500
1.8763
1.8763
1.6464
8.1175
3.5165

8
3 2/3
11 2/3

3280

Old paper lamps very much bent

8 candles broadside edge
3 2/3 "

170 L
167
168 R
336

12560
2700
15260
.7630 Ohms

Batteries
47 R
49.5 L
96.5

2,5635
6500

1.9135
1.9135
1.6464
8.1302

3.6036

4010)33
8.2

Old paper same as page 79

16 candles

185 L
181 R
366

12560
2270
14830
74.15

2.6395
.6500

1.9895 97612
1.9895
1.6464
8.1530

3.7784

6000 | 33~~00~~
5.5

.7404
1.6812

2.4216

264 candles per H.P.

---

old paper

48 candles Flashing blue
in globe

217 L
219 R 6

3|436
19

12560
.1500

14060
70.30

50 minutes

at 5-5

6-30 taken off

Bamboo High Vac

16 candles

270
270

25127
3950
29077
145.38

31406
3950
~~27456~~
35356
176.78

117
177

2.7218
.6500

2.0718
2.0718
1.16464
~~7.8368~~

~~3.6268~~

7.75~~7~~ 02

3 ~~.6672~~
~~4.5185~~

~~.9513~~

~~8.94~~

3:5420
4.5185
:9765

2.0681859
2

4.01363718
.14
2.710

117 Volts

1368.58

4230

13689.

~~3690~~

1185

3480

9.47 per H.P.

Regular Bamboo

16 candles

265 L
262 R
527

47 R

~~25.27~~
~~4000~~

~~241.27~~
~~145.63~~

31406
4000
135466
17703

117 .4.
177
819
117
117
13689 1

~~2.7340~~
~~.6500~~

2.6454
.6500

1.9954
1.9954
1.16464
7.9056

3.5428

99

3490

Gasoline
16 to 17 candles

222 L
220

~~542~~
442

18840
6020

24860
124.3

2.4150
6500

1.7650
1.7650
1.6464
7.6055

2.7819

605 ftlbs.

Bamboo .050
6.

.30
.24

Lamp visible ~~yellow~~ red

132 L
128

260

37687
11900

49587
247.935

Pt. clamp 5/8 long 1/16 125
.040 thick

.62
.16

362
62

.982

.040
4

.160
.62
.2

.12.0

.0625
2

.125
8

.1200

Lamp No 1D

~~Gasoline~~ Nov 24 1880

162 162

$3 \overline{)324}$ = 108 V

25127 3400

16

$$\begin{array}{r} 25127 \\ 3400 \\ \hline 627 \end{array}$$

$2 \overline{)28527}$ = 142 R

142 × 2 = 52

$$\begin{array}{r} 142)\,516720\,(3638\ \text{F.P.} \\ 426 \\ \hline 907 \\ 852 \\ \hline 552 \\ 426 \\ \hline 51260 \end{array}$$

$$\begin{array}{r} 3638)\,33000\,(9.7\ \text{H.P.} \\ 32742 \\ \hline 2580 \end{array}$$

Burned for 3 hour at about 70 C.

67.75 [illegible]

68.25

11.75

1.8340
2
3.6680
2.1422
1.5258
.3010
1.8268

~~1.0711~~
~~2~~
~~2.1422~~

1.0682
19
1.0701
2
2.1402

67. 3.6682
2.1402
5280
3010
8290

67.4 candles

194 - 194

132
5
660

194
194
3)388
129 V

25127 + 1300

132
8
1056

25127
1300
2)26427
132R

132)737200(5584
660
772
660
1120
1056
640

5584 ft lbs

5584)32000(5.9
504

~~62~~

~~62~~
59

62
5.9
558
310
3658

18.2
21.6

~~2.0128~~
~~1.3284~~
~~.6844~~

2.0531
1.3284
.7247
6844
.0403
2
.0806

593

2.7731
.6844
2.0887
2.0887
1.6464
7.8630
3.6868
.0806
3.6062

~~400~~0 ft lbs

4040

Lamp 15 D

Bast 17 X10

5 hours carbonizatn

16 candles

295 L
298
593

25,127
2300
27427
137.13

Batteries 58R
55 L
103

2.7050
.6844
2.0206
2.0206
1.6464
7.9998
3.6874 ~~4660~~
.0806
3.6068 4050 ft lb

Lamp 16 D

10 X 16 Burst Reg
16 candles :

250
257 R
507

18840
270
(20010
100.05

2.7316
.6844
2.0472
2.0472
1.6464
7.9176
3.6584 ~~4550~~
.0806
3.5778 3780
.5185
9407 8.72

Lamp 17 D

16 candles

265 L
274
539

18840
3350
22190
110.95

2.7324
.6844

2.0480
2.04 80
1.6464
7.9521

3.6945 ~~4960~~
.0806

3.61 3.9 4110.
.5185

9046 8.03

Lamp 18 D

10X17 Bast

266
274

540

18840
3500

22340

111.7

2.8267
.7247

2.1020
2.0020
1.6464
7.9200

3.7804
.5185

7381

126 Volts

6030

5:46

Lamp 190

10X17 Bush Bad Spot.
in it

16 candles Blue at clamps

333 L
338 R

671

18840
4650

123490
117.45

1.7364
.7247

1.0117
1.0117
1.6464
7.9570

1.6268 4230
.5185

8907 7.77

Lamps 20

10X17 Bast

16 candles

271 L

274-275

545

18840
3400

22240

111.2

2.8182
.7247
2.0935
2.0935
1.6464
7.9487
3.7821

6050

.5185
.7364 : 5:45 lamps per H.P.
2041
9405

87.4 candles per H.P

Lamp 21

10X17 last

15 candles

328
330
658

18840
3650
22490
112.45

2.7709
.7247

0462
0462
6464
9052

6440 4400

5188
6440

$7 05 ~~57~~
7.42

Lamp 22 D

16 candles

295 L
295 R

590

18840
6000

24880
124.4

busted on Nov. 28 1880 at about
[illegible]. Adll.

.7076
7247
.9828
9829
.6464
.9676
5798 3800 ftlbs
5185
9387 8.68 per H.P.
2041
1428 139 candles per H.P.

4.2608978
1.6464037
7.9706162
~~4~~ 7.0779177

1196.51

Lamp 23

253 L 16 candles
257
3)510
170

170
170
11900
170
28900
1441.3
86700
115600
11560

18.840
2700
21540
107.07 L

107)1280.2700.0(1191
107
210
107
1030
963
670
42

5½ Webers ~~times~~ the current required on Maxim

~~3/4~~ 4/3 × 5.5

4

(22.6

7.3 times the current

134 candles per H.P.

12 candles

16

9.5

80

144

156.

$$\text{Ft. lbs.} = c^2 R$$

$$\frac{\text{Ft. lbs.}}{R} = c^2$$

$$R = \frac{\text{Ft. lbs.}}{c^2}$$

$$\frac{1}{7.3}$$

$$\begin{array}{r} .8633 \\ .4316 \\ \hline .5684 \end{array}$$

$$\begin{array}{r} 2.2430 \\ 5684 \\ \hline 1.6746 \end{array}$$

47 Ohms

Dec 6 1880

18^{D} up to Dec 6th 6 PM. 139 hours Busted on Dec 8 1880

17^{D} ″ Ditto lasted 178

16^{D} Ditto busted on Dec 18 1880

Reg No 6 211 hours

Nov 25 1880
11.25 P.M.

15^{D} Nov 28 at 10 am

16^{D}

17^{D} busted at 4 PM Dec 8

18^{D} 6

20^{D} 5 PM. 28 Nov 1880

22^{D} busted on Nov 28 at 10 am 1880

23^{D} busted at 5 PM Nov 28

$$\begin{array}{r} 139 \\ 32 \\ \hline 171 \end{array}$$

79.8) 199.5000 (2.510
1596
3990
3900
900

2510) 33000 (13 ~~2~~ per H.P.
2510
7900

1
~~6~~
~~6~~
6
~~6~~

1.8260748
2
3.6521496

13
16
78
13
20.8 candles
per H.P.

6 - 6
7 15
8 12
67

6
16.5
5.5
280

Half length Bamboo
3"

16 candles Battery
32 L
32 R

100 L
102 R
3202
67
67.3

1.2560
3400
15960
79.8 Ohms

Put on at 16 C at 11 am
~~Dec~~ Dec 3 1880
Dec 3. 14 hours Black on the globe
up to Dec 6. 6 PM. 37 hours
28
Busted of Dec 8. at 65 hours
1 PM.

82.3) 164950 (2000
1646
350

216
21.7
433

184.5 : 433 :: 82.3 : 193
82.3
1107

2.63649
1.91440
7.73401
2.28590

4000) 33000 (8.25 per H. P. of 17 candles
32000
1000

2012) 33000 (16.4
2012
12880
12072
8080

Half length carbon

8 1/2 candles

91.5 L

93 R
184.5
61.5

15960
500
16460

61
61
61
366
3721
443
11163
14884
82.3 14884

82) 1648403 (2013
164
84
82
203

143.13
~~109~~) 526330.00 (0367
42939
96940
85878
110620

3690) 33000 (

0374
0374
6464
8447
5659
5165
9516

3680

8.9

Regular No. 1.
Dec 3 1880

32.5 R
31.5 L

162 L
165 R
327
1.09 25127
3500
28.627
143.13 Ohm

143 : 109 :: 143 : : 143 + X

109 : 143 : 143 . 143 + Y

150,42) 53003000 (35.20
45126
78770
75210
3560

3520) 33000 (9.3 per H.P
31680
13200

214
2
3) 428
142

.0434
0434
6464
8225
5557 3600

Regular No. 2
Dec. 3. 1880

165 L
167 R
332
110.6
25127
5000
30127
15042

181.5) 866280 (4780
7260
142 28
12705
15230

No 4 Regular

11 candles

210 L

31406
4900
36306
181.53

169)744000 (4400
676
680
676

No. 3 Regular

Dec 3 1880

16 candles

194 L
195 R
389
129.6

31406
2400
33806
169.03

1205

178 Rs

2.0791812

2

4.1583624

2.2504200

1.9079424

1.6464037

3.5543461

3583.8

120

120

2400

120

14400

443

43200 0

57600

5760

178) 637920.0 (3583

4 534

12 1039 34

890

3 1492

1 4 24 2

6

2

2

x

y

z

x

y

z

9(x+y)

7(y+z)

~~8y8~~ 8x − 8y = x+y

3 4 4 4

368) 198054
5890
1465

5

2304
86
13824
18423
198054

585
406

$9x+9y = 7y+7z \quad = 9x+2y-7z=0$

$8x-8y = x+z \quad 7x-8y-z=0$

$x+y+z = 1152 \quad x+y+z = 1152$

$9x+2y-7z=0$

$72x+16y-56z=0$

$14x-16y-2z=0$

$86x-58z=0$ (1)

86
9
774 5

$9x+2y-7z=0$

$2x+2y+2z=2304$

$7x-9z=-2304$

$86x-58z=0$

~~7(86x x)~~

$7(86x) - 774z = -198054$

$86)7x) - 406z = 0$

80 $368z - 198054$

16273
436

38
9

4.2114676
2.6344865
310
6.85.09541
24
18

9541
9463
9541 8
9463 8
9 78
24

7095 [illegible] 81

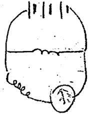
10

7095028
50
7095028

$\mathcal{E} =$

$\mathcal{C} =$

$$\mathcal{C} = \frac{\mathcal{E}}{r + \frac{S(P+g)}{S + (P+g)}}$$



S P+g

$r = R - (2P + g_{al})$

Batt Res =

$$r = R - (2P + g_{al})$$

$2 \sim R = 2P + g$

$g = 2P - R$

$g = R - 2P$

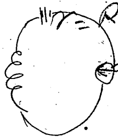
$$\frac{R_1R_2}{R^2}$$

$R_1 R_2 R^2$

$$\frac{\cancel{R_1}R_2}{\cancel{R_1}} + \frac{R_1\cancel{R_2}}{\cancel{R^2}}$$

$r = R - (2P + g) = 7$

35



Marion

600

$\frac{150}{600} = \frac{40}{20}2$

Sara Sarah Marion

126 2.1004
~~63~~
comp 40 8.3978
Comp 1.08 9.9666
0.4648

2.92 to a Volt

2.5539
.4648
2.0891 122.6 Volts
2.0891
1.6464
7.7764
3.6010 6010
.5185
.9175 8.23 per H.P.

Lamp No. 5

Dec. 13, 1880.

40 cells

~~[illegible] L~~
~~[illegible]~~
65
61
126
~~63~~

16 C

177 L
181 R
358

25127
8350
33477
167.38

5752
4648
.1104

129 Volts

Lamps No. 6 regi
Dec. 13, 1880.

16 c

185 L
195 R
188 L 17c.

185
191
374

31406
4800
35206
176.03

324

5105
4648
.0457 111 Volts
0457
6464
8477 3850
5855
5185
9330 8.57 per lp

Lamps No. 7 reg

160 L
164 R
324

3.24

25127
3300
28427
142.13 Ohms

5250
4648

060.2 115
0602
6464
8265

5933 3930
5[illegible]88

9252 8.42 per HP.

Lamp No. 8 reg

165 L
170 R

335

25127
4700

29827

149.13 Ohms

5185
4648
0537   113.3

Lamp No. 9

162 L
168 R
330

25127
3400
28527
142.6

Lamp No 10

159
164

323

25127
2000

27127

135.6

Lamp No. 11

285 L
247 R

31406
3600

Lamp No 12

25 v. L

25127
3600

3688 5658
3978
9665
9302 8.51

3464
9302
4162 26.1
4162
6464
5031
9819 959
5188
5366 34.4 per H.P.

1/4 length lamp

4 c

Dec 5
1880

110 L
112 R
3222

16279
31.38

Went up after
burning 2.42 hours
at 24

4232 —
930 —
4930
4930
6464
530 —
1626
51~~8~~8
3559

1450

22.7
8
181.6

1/3 length [illegible]

8 Candles

131 S
134 R
265

5900
295

4518
9302
5216

5216
6464
5376
2272
5185
2913
0792
3705

16.80 ~~+ [illegible]~~

19.5

234. candles per H.P.

1/4 lengths req

12 in

140 L
143 R
283

5800
29.

4698
9302
5396
5096
6464
5427
2683
5185
2502
2041
4543

1850

284

1/4 legth — reg

16 Candles

145 L
150 R
295

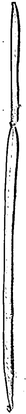
15730
2865

4671
9302

45 69 28.6
4569
6464
4034

9636
5155

5449 35.1



1/3 length 5

Dec 15 1880

5 1/3 candles

152 L
155 R

307

6279
1620

7899

39.49

at 24 C. at 8.55 P.M.
busted at 1.30 PM Dec
16 1880 . 16.5 hours

5302
9302

6000

6000
6464
4187

2653 1840
5185

2532 17.9

1/3 length reg

10⅔ candles

167 h
172 R

339

6279
1350

7629
38.14

5399
9302

6297
6297
6464
4283

3341
5185

1844

$$\frac{U^2 \times 44.3}{R_1}$$

15.3 per H.P.

1753 ft lbs.

1714)33000(1.
1714

4.1655708
1.6464037
8.4317983

4.2437728
5.7562272
4.5185139

0.2747411 1818 H.P.

1/3 length very

16 candles
very ~~bi~~ [illegible]

179 L
184 R

3)363

121

40 cells

187 R
181 L

368

6279
1180

7459
3702

3.165708
64660

40 cell = 1~~50~~ 64 ~~480~~ 64

lamp 20 14

64
64
128

185 - 185

31406
1700
33106

166. Ohms

16 C

8.2 per H.P.

Lamp 15

~~went~~ I put it in
the Phono room and
an arc spring
and it went.

Lap 16

167 – 167

167
167
334

25127 + 2500

111,3

25127
27627
1381.1

16 C

8.3 per H.P.

Lap 17

165 – 165

25127 + 3500

25127
28627
1431.3

16 C

165
165
330

110

0414
0414
6464
8447
5739
5185
~~[illegible]~~
9346

3750
~~[illegible]~~
~~[illegible]~~
8.4

Lauf 18

165 — 165

25127
2000
27127

16 °C

135.1

165
165
320
110

6414
0414
6464
8697
5989
5185
9396

3970

8.67

Lauf 19

158 — 158

2100
25127
27227
1360

16. °C

158
158
316
105 Vo

8.9 ~~[illegible]~~ H.P.

Lamp 20

173 — 173

25127

5800

30927

154.63 Ohms

16 C

Lamp 21

176 — 176

3140.6

157 ohms

16 C

22

165 — 165

25127
4100
(29227
146.1 Ohms

16 C

23

164 — 164

25127
1800
26927 134.6 Ohms

16 C

24

165 - 165

25127
2000

16 C

25

167 - 168

25127
1700

16 C

26

176 – 176

25127
4800

16

27

162 – 163

25127
1700

16

28

178 – 178
25127
4700

16

29

Bad vac.
went up.

17.8 -178

31406

157. Ohms

178
178
356
119 Volts

16

8.2 per H.P.

16.8 -168

168
168
336
11.2 Volts

25127
3000
28127

14.06 Ohms

8.4 per H.P.

32

165 — 165

165
2
3)330
110.

18840

5500

64)128 (2.5
370

42.3
2.5
2115
846
10575

16

432 : 64 :: x : 168
432
336
504
672
64)72576 (113
64
85
64
217
192
256

83

168 — 168

25127
3500
~~60627~~

168
3)336
112

16

3

64)168 (2.6
128
400
384

128627
143

1.08
40
4320

43.2
2.6
2592
864
11234

2)84
2)128
42.

112
143 R

158 — 185

158

27

1

28

158

.158

316

105.[illegible] Volts

106 Volts

130 Ohms

160

.0253

.0253

.6464

.8861

6970

1139

.5831

30 .5831

34

131 5797

33

132 5764

33

133 5731

3830

3800

3770

3740

133 5731

32

134 5699

32

135 5667

32

136 5635

31

137 5604

31

138 5573

31

139 5542

31

140 5511

30

141 5481

30

142 5451

30

143 5421

30

144 5381

3740

3710

3690

3660

3645

3610

6970

146 1644

5326

30

6

6970

1614

145 5356 3430

30 3400

146 5326

29

147 5297

29

148 ~~5268~~

5267

29

149 5238

29

150 5209

29

151. 5270

```
     6970
     1818
152  5152
       29
153  5123
```

150 — 150

18840
2700

16

150 — 150

18840
2700

16

154–155

18840
3300

16 C

160.–159

25127

16 C

150 — 150
18840
4500

16e

2)23340
116

---

177 — 177
25727.
16e

165 - 165

25127
2000

16 C

150 - 150

18840
2300

---

16 C

156 – 156

25127

16 C

150 – 150 ✓

18840
4600

16 C

172 - 172

25127
3800

16 C

149-157
18840
3000

16 C

192 - 192

25127
6500

16

149 - 149

163-165

25127+2500

16 e

149-149

2500

16 e

150 - 153
25727
900

16 C

178 - 178

155 - 155

155 - 155

25127
2000

16

~~156 - 156~~

168-168

25127
4550

16

155-155

177 – 172,

170 – 170

58

158 – 158

59

159-159

60

192. — 193

61

158 — 158

165 – 165

25127
2700

16

.165
2
3)330
110.

2000 : 100 : 2)15~~000~~
75

2~~70~~00

2400 :

---

157 – 157

18840 1.L
3200

16 4)22240
11

2000 : 100 : 1980

~~2000~~)198~~000~~
99

~~2000~~ : 1000 ; 1800

2)19~~0000~~
95

2)18~~000~~
90

1

64ᵃ

164—164

65ᵃ

166—166

157 - 157

Went up

~~174-17~~

146-146

174-174

170–170

153–153

165 – 165

158 – 158

74 a

200, 200

75 a

170–179

76a

155-155

77a

164-164

78 a

166 — 166

79 a

188 - 188

150-150

153.153

82 a

190—190

83 a

153-153

84 a

166 — 166

85 a

158 - 158

86 a

195 – 195

87. a

160 – 160

150 – 150

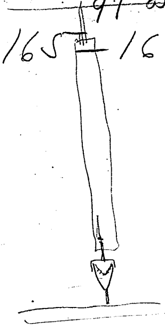
168 – 168

90 a

177-177

91 a

165 165



92 a

160 – 160

93 a

~~164 – 164~~

162 – 162

170 — 170

175–175

96 a

~~106~~

~~165 – 165~~

163 – 163

97

183 – 183

98 a

165-165

99 a

176-176

100 a

175 - 175

101 a

172 — 172

102 a

177-177

103 a

173-173

104 a

173-173

Clamp Split

105 a

173-173

106a

165-165

107a

175-175

108a

106—106

109a

159-157

$C = \frac{E}{R}$

~~R~~

$C = \frac{E}{R}$

$E = CR$

$R = \frac{E}{C}$

1 Marion

2

B 2

M M

m Mani

110 a

175–175

111 a

174–174

178-178

$$\begin{array}{r} 178 \\ 3\,\overline{)\,3\,5^{2}6} \\ \underline{\quad\quad} \\ 1\,1\,\overset{1}{8}. \end{array}$$

180—180

166—166.

~~188 – 188~~ 1

170 – 170 2

116

ges

169 — 169

1615

16601880

1.45

1

1/4

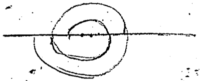
1.45.W

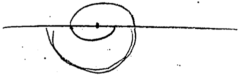
98 U a

Ro..6

117 a

169 — 169,





80
67

13)67(5.1
65
2

5.1
5.1
2

5.1
5.1

51
255
26.01
2
52.02

2(x

133